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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
09 753,664	01 04 2001	Liming Tsau	1875.0230000	1902

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EXAMINER

BRAIRTON, SCOTT A

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 03 27 2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/753,664

Applicant(s)

TSAU, LIMING

Examiner

Scott A Brairton

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jang et al (U.S. Patent No. 6,297,162) in combination with Parikh (U.S. Patent No. 6,225,207).

Jang et al disclose in figures 1-15 and related text a method of forming a semiconductor device comprising the steps of forming a first dielectric layer (figure 4, 43) comprising silicon oxide (col. 1, lines 35-40) on a substrate (figure 4, 41), forming a metal layer comprising copper (figure 4, 42, and col. 2, lines 5-10) in the first dielectric layer wherein the metal layer does not extend all the way down to the substrate (figure 4), forming a stop layer (figure 4, 44) comprising silicon nitride (col. 2, lines 15-20) on the first dielectric layer and the first metal layer, forming a second dielectric layer (figure 4, 45) on the stop layer, wherein the first and second dielectric layers are thicker than the stop layer (figure 4).

Jang et al fails to expressly disclose using masks to pattern the dielectric layers as well as forming two openings in the second dielectric layer that expose portions of the stop layer and then using a third mask to remove a second portion of the second dielectric layer and a portion of the stop layer, thereby exposing a portion of the metal layer, and finally filling the openings in the second dielectric layer with a copper or copper alloy.

Parikh discloses in figures 1-13 and related text a method of forming a patterned masking layer (figure 3A, 322) over the substrate (figure 3A, 310) such that a portion of the second dielectric layer (figure 3A, 320) is exposed; removing the exposed portion of the second dielectric layer (figure 3B) so that a first opening (figure 3B, 326) and a second opening (figure 3B, 324) are formed in the second dielectric layer, thereby exposing portions of the stop layer (figure 3B, 314); forming a third patterned masking layer (figure 3D, 325) over the substrate such that a further portion of the second dielectric layer and a portion of the stop layer are exposed; removing the exposed portions of the second dielectric layer and the stop layer (figure 3E); and filling the first and second openings with a copper or copper alloy thereby forming a second metal layer (figure 3F, 350, col. 7, lines 64+). Parikh further discloses chemical mechanical polishing second metal layer 350 (col. 8, lines 1+).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method of Parikh with the method of Jang et al in order to provide for a cost effective, improved technique for damascene fabrication (col. 2, lines 50-55).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A Brairton whose telephone number is (703) 605-4213. The examiner can normally be reached on M-F, 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the

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organization where this application or proceeding is assigned are (703) 746-4082 for regular communications and (703) 746-4082 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Scott A Brairton
Examiner
Art Unit 2823

sab
March 19, 2002

A. PM
LONG-TERM
PRIMARY EXAMINER